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CONTRIBUTIONS TO THE MORPHOLOGY OF THE LARVAL ELATERIDAE (COLEOPTERA). NO. 2: *AGRIOTES LIMOSUS* LECONTE*

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Agriotes limosus LeConte is the third North American species of *Agriotes* Eschscholtz for which the larva definitely is known. It is a woodland form and, therefore, of much less economic importance than the meadow-inhabiting species such as *Agriotes mancus* Say, the wheat wireworm, but it is of greater taxonomic significance since it lacks the characters that have been universally regarded as definitive of *Agriotes* larvae.

Agriotes limosus is widespread over Canada, but definitely identified larvae are known only from the park and forest areas of northern Saskatchewan. The larvae never have been found in abundance but are believed to be of minor economic importance (King, p. 705, 'a species of Agriotini?'), since they occur in wireworm-damaged grain fields along with larvae of *Cryptohypnus nocturnus* Esch., *Ludius aeripennis destructor* Brown, and *Limonius pectoralis* Lec., all of which are important pests of cereals. Specimens identified through rearing have been collected from recently broken parkland at Carmel and Naicam, Saskatchewan, and seemingly identical larvae have been found in the damp litter under well grown aspen poplar (*Populus tremuloides* Michaux) at Lake Waskesiu and in fields which have been under cultivation for many years in the Cleeves–St. Walburg district. The larvae appear to prefer moist, but well-drained, situations: at Cleeves all larvae were found in the lower parts of the fields in a shallow, grey, podsolized soil overlying almost pure sand; at Lake Waskesiu the two-inch layer of leaf litter covered an extremely sandy subsoil.

Nothing is known of the duration of the larval period or of the habits of the beetles. The larvae which were reared to maturity pupated in soil during the last half of July, and the pupae transformed to adults after about two weeks.

The writer is indebted to W. J. Brown, Division of Entomology, Ottawa, Ontario, for the identification of reared adults, and to K. M. King and A. P. Arnason of the Dominion Entomological Laboratory, Saskatoon, Saskatchewan, for helpful notes on the ecology of this species.

TAXONOMIC RELATIONSHIPS

Knowledge of other *Agriotes* larvae is limited to several European species and to *A. mancus* Say and *A. pubescens* Mels. of North America. Specimens of *pubescens* were not available to the writer, but Forbes (1892, p. 34) reports this larva as indistinguishable from that of *mancus*. The larva of *limosus* may be separated readily from these two American species and related European forms through the absence of "eye spots" on the ninth abdominal segments (Figs. 11, 12) and the lack of a prominent expansion of the anterior inner margin of the mandible (Figs. 2, 3). Other characters differentiating *limosus* and *mancus* are: the posterior part of frons (*fcl*, Fig. 6) terminates truncately in *limosus*, usually pointed in *mancus;* on the ninth abdominal segment, the distance between the pleural area and the tip of the segment approximates five-sevenths of the

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total length of the segment in *limosus* (Fig. 10) and about eleven-twentieths in *mancus;* the general colour of *limosus* is yellowish brown, *mancus* bright yellow; *limosus* is predominantely a forest species, *mancus* a typical meadowland form; *limosus* appears to be associated with the northern coniferous forest and its various successional stages, particularly the aspen poplar, and occurs from the Atlantic Coast to the Rocky Mountains, while *manus* apparently is associated with the meadows of the eastern hardwood forest and occurs from the Atlantic Seaboard to Manitoba and Minnesota and as far south as Missouri.

In elaterid larvae, the large, pigmented, tergal impressions on the ninth abdominal segment (*es,* Fig. 12) and, to a lesser extent, the subapical tooth on the mandible (*ex,* Fig. 3) have been regarded generally (Forbes, p. 28; Henriksen, pp. 234, 284; Roberts, p. 119) as characteristic of the genus *Agriotes.* It would now seem that these characters are not definitive of the genus as a whole, but only of the *mancus group.* This conclusion is supported not only by the evidence from *Agriotes limosus,* but also from the larva of the European *Agriotes pallidulus* Ill. to which Beling (1883) refers as lacking the conspicuous eye-like impressions on the ninth abdominal segment.

From a study of the literature and a preliminary examination of the larvae of the known North American species of the subfamily Elaterinae, the writer proposes the following as generic characters of *Agriotes;* ninth abdominal segment without preapical setiferous tubercles and terminating in a blunt point or in a very short sharp point; nasale of one tooth, terminating tridentately when uneroded; larva sparsely and finely punctulate, but without conspicuous pits or other prominent sculpture; antennae bearing one "sensory" appendix on the second segment; and mandibles with retinaculum and with or without other tooth-like expansions.

On the basis of larval characters, the closest relatives of *Agriotes* Esch. are found in *Dalopius* Esch. and *Agriotella* Brown. However, as far as is known, the larvae of both of these genera are characterized by whorls of small, preapical, setiferous tubercles on the ninth abdominal segment.

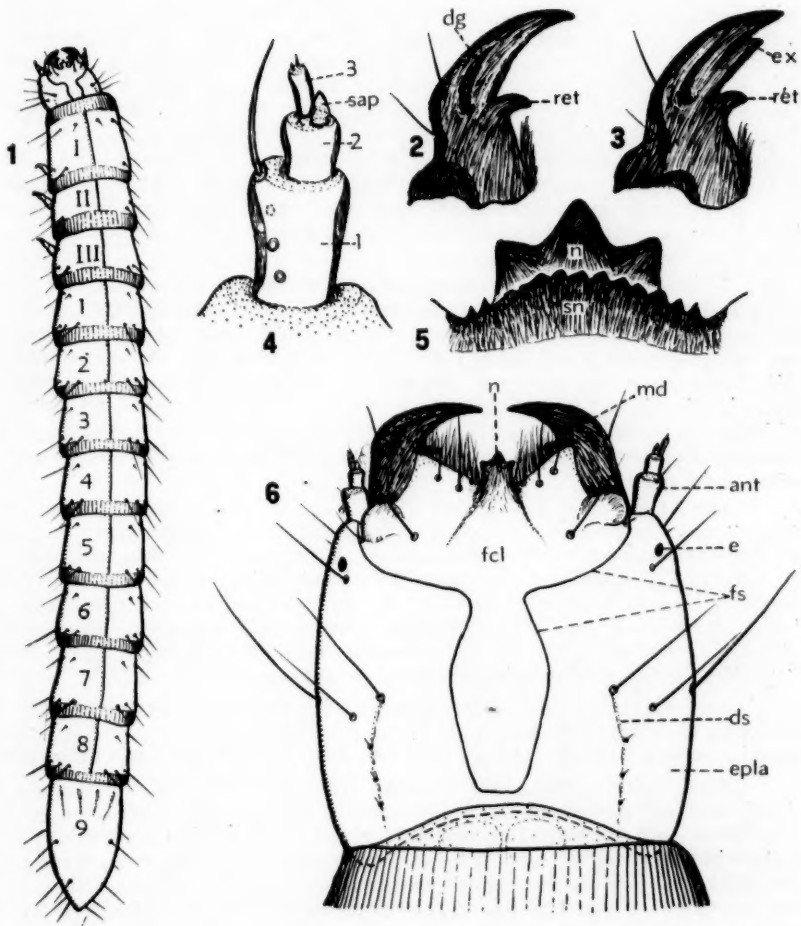
DESCRIPTION OF THE MATURE LARVA OF *AGRIOTES LIMOSUS* LECONTE

In the absence of larval material of closely related species for comparison, an exhaustive description has not been attempted, but sufficient detail is given to distinguish this larva from other known North American wireworms. The species has been described from fourteen larvae and from the last larval exuviae of three reared specimens. These were collected from the following points in Saskatchewan: Carmel (3), Naicam (3), Cleeves (3), Crooked River (6), and Lake Waskesiu (3). All of this material is deposited in the Canadian National Collection. The terminology adopted was developed during detailed, comparative, morphological studies in which the writer recently has been engaged and differs considerably from that used in the first paper (Glen, 1935) of this series.

Mature larvae (Fig. 1) measure up to 19 mm. in length when fully distended; greatest breadth up to 1. 3 mm., usually across the third and fourth abdominal segments. Body cylindrical, sides subparallel, plueral membranes small and inconspicuous. Pale brown or yellowish-brown in colour. Dorsum slightly rugose, sparsely punctulate, punctures small, shallow and inconspicuous.

Head (Figs. 6, 7, 8) subquadrangular, convex dorsally. *Frontoclypeal region* (*fcl,* Fig. 6) sparsely and finely punctulate; frontal sutures (*fs*) distinct; posterior portion terminating just before reaching base of head; truncate posteriorly. *Nasale* (*n,* Figs. 5, 6) of one tooth but with tip tridentate when uneroded. *Subnasale* (*sn,* Fig. 5) consisting of transverse ridge, anteriorly convex, finely serrate (when uneroded) with from twelve to fourteen subequal, short, sharp, forward-projecting denticles. *Epicranial plates* (*epla,* Fig. 6) sparsely and finely punctulate, dorsal sulci (*ds*) very shallow, each with four subequally spaced

PLATE IV.



Figs. 1, 2, 4, 5, 6, *Agriotes limosus* Lec.: 1, well grown larva, dorsal aspect; 2, left mandible, dorsal; 4, right antenna, ventral; 5, nasale and subnasale, ventral; 6, head, dorsal.
Fig. 3, *Agriotes mancus* Say, left mandible, dorsal.

setae, the most anterior hair being very long, others minute; ventral sulci (*vs*, Fig. 7) conspicuous, each with two to four prominent setae and a few minute hairs; each gena with four or five prominent "latero-epicranial setae" (*les*, Fig. 8) usually arranged as two pairs with an unpaired hair further dorsad, ventral pair sometimes reduced to a single seta; eye spot (*e*) black, ovate or circular, surrounded by four setae, two being prominent. *Postgenal areas* (*pge*, Fig. 7) expanded mesally, usually meeting; each with one small seta in central area. *Gula* either extremely narrow or entirely closed. *Antennae* (*ant*, Fig. 6; Fig. 4) with first segment (1) at least twice as long and nearly twice as wide as second segment; second segment (2) bearing one well-developed conical sensory appendix (*sap*) just ventrad to base of third segment; third segment (3) narrow, but about as long as second segment. *Mandibles* (*md*, Fig. 6; Fig. 2) with prominent retinaculum (*ret*), but lacking other prominent teeth or carinae; dorsal groove (*dg*) shallow. *Ventral mouth parts* (*vmth*, Fig. 8) exclusive of palpi about two-thirds as long as sides of epicranium. *Cardines* (*cd*, Fig. 7) well developed, medial margins almost touching. *Stipes* (*stp*) large, subrectangular, four or five setae on antero-latero-ventral aspect; proxistipes and dististipes very indistinctly separated. *Postmentum* (*pmt*) subrectangular. Labial palpi with basal joint bearing several short setae.

Prothorax (Figs. 7, 8) about as long as mesothorax and metathorax combined. *Tergites* (*t*) minutely punctulate; without "impressions"; anteriorly (on each side of median suture) usually with eight to ten setae in transverse row, not definitely paired, one being noticeably nearer to mid-dorsal line; posteriorly with five setae in transverse row, arranged as two pairs with a single seta further laterad. No distinct laterotergites, but faint line suggests internal ridge at point of fusion of medial and lateral sclerites. *Prosternum* (*prst*) shield-shaped; consisting of one sclerite, striate on antero-lateral aspects and bearing two prominent setae along each side.

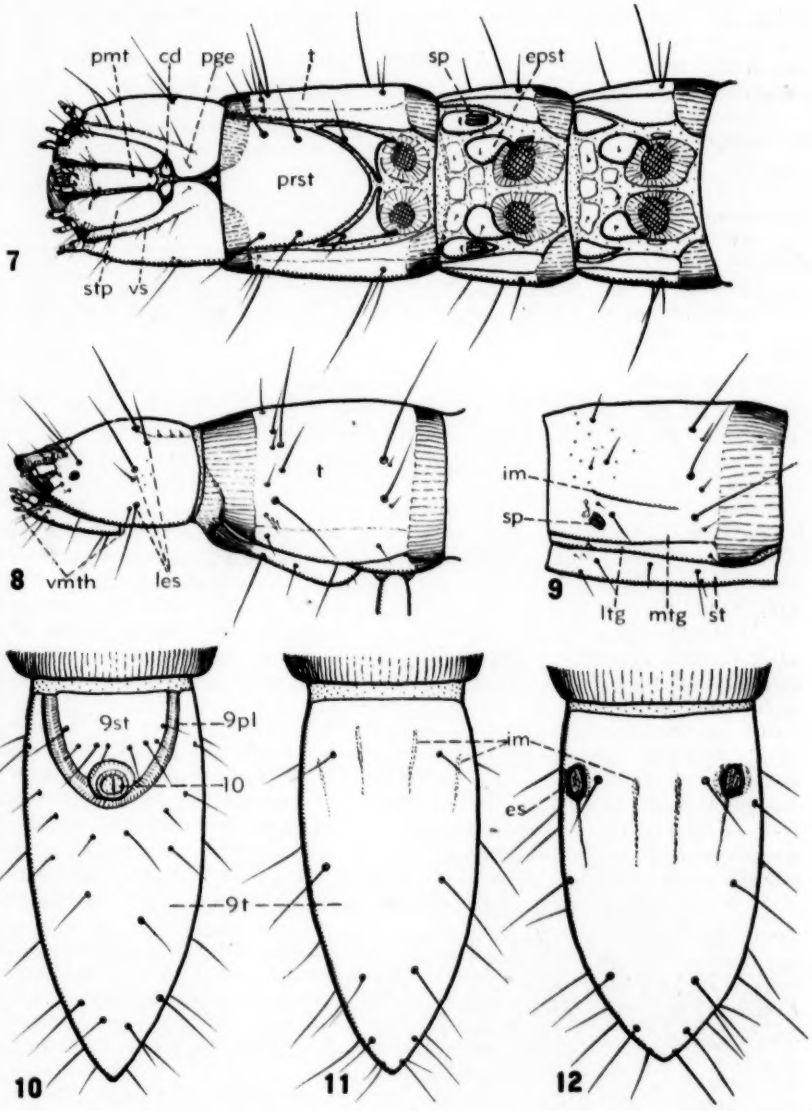
Mesothorax and *metathorax* (Fig. 7) each much wider than long. *Mediotergites* punctulate, punctures very small, but slightly larger and more abundant in anterior half; without impressions; anteriorly with transverse row of three to five small setae, the most lateral hair being largest; posteriorly with transverse row of four setae, arranged as two pairs, one of each pair small; glabrous elsewhere, except that additional minute setae sometimes observable in punctures. *Episternum* (*epst*) subtriangular, without spine-like setae. *Spiracles* (*sp*) biforous, larger than spiracles in abdominal segments.

Legs well developed. *Coxa* subcylindrical, excavated on outer surface for reception of trochantér and femur; bearing up to twenty-two spine-like setae on anterior surface. Other segments well supplied with spine-like and finer setae.

First eighth abdominal segments (Fig. 9) subequal. *Mediotergites* (*mtg*) with scattered small, shallow punctures; with a shallow linear longitudinal impression (*im*) laterally, but without any definite transverse impression; anteriorly with four or five scattered setae; posteriorly with six setae, three small. *Laterotergite* (*ltg*) narrow, subrectangular, slightly narrower anteriorly, extending length of segment and joined posteriorly to mediotergite. *Pleurites* lacking. *Sternum* (*st*) of one piece, large, subquadrate, with longitudinally striate posterior margin; sparsely punctulate; without definite impressions; usually bearing about ten conspicuous setae, mostly along lateral margins.

Ninth abdominal segment (Figs. 10, 11) subconical; about one and one-half times as long as and almost as wide as eighth abdominal segment; twice as long as wide; posterior half tapering to a blunt point. *Tergite* (*9t*) with shallow irregular wrinkles and four faint longitudinal impressions (*im*) near base; subovate, eye-like impressions entirely lacking. *Pleural area* (*9pl*) faintly striate. Distance between tip of segment and plueral area approximates five-sevenths

PLATE V.



Figs. 7 to 11, *Agriotes limosus* Lec.: 7, head and thorax, ventral aspect (legs removed); 8, head and prothorax, lateral; 9, third abdominal segment, lateral; 10, ninth and tenth abdominal segments, ventral; 11, ninth abdominal segment, dorsal.
Fig. 12, *Agriotes mancus* Say, ninth abdominal segment, dorsal.

of total length of segment. *Sternum* (9*st*) of one piece, bearing approximately eight setae in irregular transverse row in front of tenth abdominal segment.

Tenth abdominal segment (10, Fig. 10) short, tubular, bearing a whorl of ten fine hairs; without anal armature; anal aperture linear and median.

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ON THE CHARACTERS OF TWO GENERA CLOSELY ALLIED TO *EUPITHECIA* (LEPIDOPTERA, GEOMETRIDAE) *

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Two generic names are at present in use for those North American species of the *Eupithecia* group which show specialized frontal development. *Nasusina* Pears. (1908, Can. Ent., XL, 344) was proposed for the species originally included in the European genus *Gymnocelis* Mab. by Hulst, with *inferior* Hlst. designated as genotype. Seven species, all with supposedly "nose-like prominence of the front", were originally listed in the genus; later the same author (1909, Proc. Ent. Soc. Wash., XI, 119; 1910, op. cit. XII, 138) added several species, including two new ones.

In 1918 Barnes and McDunnough (Contr. IV (2), 141) called attention to the fact that the frontal structure was by no means similar in all the species placed by Pearsall in *Nasusina*. Owing to Pearsall's unfortunate type designation, *Nasusina* was restricted to *inferior* Hlst. and two other species with similarly bulging and closely scaled fronts, viz. *minuta* Hlst. and *vaporata* Pears. The generic term *Prorella* was proposed for the other species with cone-like frontal prominences; *niveifascia* Hlst. and *opinata* Pears., in which the front appeared normal, were transferred to *Eupithecia*. This grouping was followed in the 1937 Check List.

A recent genitalic study, comprising both sexes, has shown that this present grouping is, in part at least, artificial, and that species with extraordinarily similar genitalia may show different frontal structures. *Nasusina vaporata* Pears., for instance, can scarcely be separated genitalically from *Eupithecia mendicata* B. & McD., whilst *Eupithecia opinata* Pears. clearly belongs in the *Prorella* group although the front is not cone-like.

Further investigation shows that a character used by Grossbeck (1908, Jour. N. Y. Ent. Soc., XVI, 21) in his discussion of *Gymnocelis*, i.e., the absence or material reduction of the upper pair of spurs on the hind tibiae, while possibly of more weight in the genus *Prorella* as a means of establishing relationships (*opinata* falling here on this character as well as on similarity of genitalia),

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is not so useful in *Nasusina*. Here we find that *vaporata* Pears. and *mendicata* B. & McD., with genitalia remarkably close both to each other and to *inferior* Hlst., possess the normal type of hind tibial spurs found in *Eupithecia*. The third species included in *Nasusina*, viz. *minuta* Hlst., lacks constantly the upper pair of hind-tibial spurs, has a frontal structure quite similar to that of *inferior*, but in genitalia shows no close relationship. It would appear, therefore, that there is no set of constant characters on which to base the genus *Nasusina* and that it will probably eventually have to be absorbed into *Eupithecia*.

For the present, however, I am retaining the term for four species which may be keyed out as follows:—

1. Hind tibiae with single pair of spurs; front bulging ..... *minuta* Hlst.
   Hind tibiae with two pairs of spurs 2
2. Upper pair of spurs on hind tibiae much reduced in size, front bulging ..... *inferior* Hlst.
   Both pairs of spurs on hind tibiae equal in size 3
3. Front truncately bulging; discal dot on primaries minute ... *vaporata* Pears.
   Front flat and oblique; discal dot on primaries well developed ..... *mendicata* B. & McD.

With regard to *Prorella*, as already noted, the fact that the upper pair of spurs on the hind tibia is much shorter than the terminal pair seems to have considerably more value from a generic standpoint than the presence of the cone-like frontal prominence. *Opinata* Pears. and *protoptata* McD. fall into *Prorella* on this character although possessing the flat front of *Eupithecia;* general similarity of genitalia point also to this association. In the whole group in the female genitalia the *ductus seminalis* arises on the right side near the base of the *bursa copulatrix*, forming a loop as it curves ventrad over the ventral surface of the bursa (*vide* figure of *protoptata*, Can. Ent. LXX, 237, Pl. XX, fig. 5d); in most cases also the gonapophyses are extremely long (*protoptata* is an exception). *Pertusata* McD. might also be doubtfully placed in the group on the strength of the shorter upper spurs, but I hesitate to do this as the male clasper is very dissimilar and seems to show relationship to *anticaria* Wlk.; it might be a connecting link between the two groups.

The following new synonymy in connection with one of the species is offered.

Prorella albida C. & S.

Nasusina albida C. & S., 1923, Lepid. IV, 16.
Eupithecia ruthiata Cass., 1923, Lepid. IV, 63 (*new synonymy*).

Of *albida* a male paratype from Eureka, Utah, is before me. *Ruthiata* was described from several specimens from Jemez Springs, N. M., and a single Arizona male. Of these, two paratypes from the former locality are before me, the one, a very worn male, dated Aug. 18, is erroneously placed and appears to belong to *maestosa* Hlst., the long palpi at once distinguishing it, the palpi in true *ruthiata* being described as "very small". The second specimen, a female with missing abdomen, agrees with the original description; it is also worn and the head is much crushed, owing to having been papered; a *bulging* front, (but not noticeably conical), can, however, be discerned; this, together with the color and maculation of the wings and the much reduced first pair of hind tibial spurs, agrees with such characters in our paratype of *albida* and I believe justifies the placement of *ruthiata* as a synonym.

A NEW GENUS OF THE FAMILY TACHINIDAE FROM ALBERTA.

BY E. H. STRICKLAND,
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Evanalia new genus.

Female. Frontal profile slightly arcuate, gently sloped, less than equal in length to the facial profile. Clypeus slightly depressed. Vibrissae strong, cruciate, just above the oral margin. Facial ridges bristled on much less than one-half their length. Oral margin axis almost equal to antennal, the latter well above eye middle. Proboscis about three times head height; slender haustellum two and one-half times head height, set with erect hairs. Palpi long and cylindrical. Antennae reaching almost to the oral margin, the third joint almost three times the second in length, the arista thickly short pubescent. Frontal bristles extending to approximately the apex of the second antennal segment. Outer verticles short. Ocellar bristles strong, divaricate and proclinate. Parafacials bare and at the narrowest point less than one-third the width of the third antennal segment. Genae one-fifth eye height. Eyes bare.

Middle of propleura bare. Prosternum bare. Three intra-alar bristles. Two lateral scutellars. Apical scutellars weak and divergent. Three sternopleurals. Lower lobe of squamae bare above, infrasquamal setulae absent. Wings clear hyaline or very slightly greyish, with the anterior cross vein missing and the fourth longitudinal (Radius 5) incomplete at the apex. Posterior cross vein (Median 3) sinuate. Radius 1 bare, Radius 5 bristled less than halfway to the cross vein.

No median marginals on the first abdominal segment, a pair of median marginals and one or more pairs of lateral marginals on the second, a row of marginals on the third. Ventral membrane covered.

Genotype: *Evanalia medicinensis* n. sp.

Greene (1934) issued a key to all tachinids with an evanescent third vein. None of species described had a proboscis similar to that of the genus here described.

In Curran's (1934) key to the genera, *Evanalia* runs to couplet 346, *Euryceromyia* Townsend, (1892, Trans. Am. ent. Soc., 19:115. Genotype *E. robertsoni* Twns. South Illinois) which it resembles in wing venation but from which it differs in the absence of any enlargements of the antennae (at least in the female), the absence of bristles at the base of R_1 and their presence at the base of R_5, and the length of the proboscis.

The closest relatives appear to be *Trochiloglossa* Townsend (1919, Proc. U. S. Nat. Mus., 56:561. Genotype *T. tropica* Townsend. Recorded as ranging from Sao Paulo to central Matto Grosso) and *Trochiloleskia* Townsend (1917, Bull. Am. Mus. Nat. Hist, 37:226. Genotype *T. flava* Townsend. Matto Grosso). From both these genera the one under discussion differs in having the apical cross vein missing and the fourth vein evanescent.

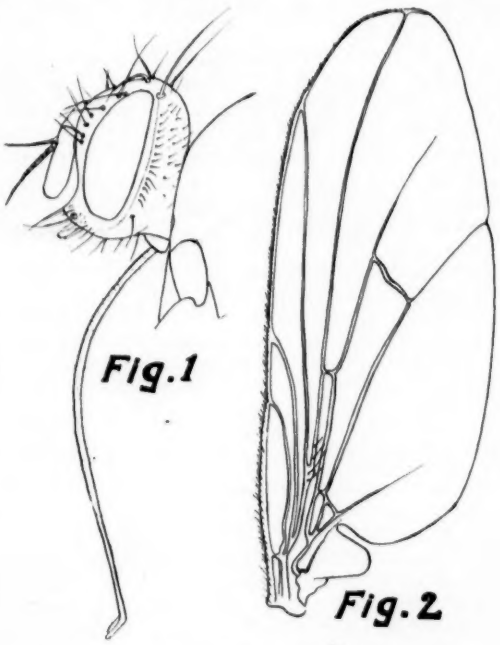
Trochiloleskia Twns. is listed in the Curran (1934) index as a synonym of *Neaphria* Townsend (1914, Ins. Ins. Mens., 2:12. Genotype *N. dexina* Twns. Chosica, Peru.) but neither genus is given in Curran's key. *Neaphria* Twns. also has the wing venation complete and is described as having the arista bare and the eyes faintly hairy (Townsend 1939, vol. VIII).

Evanalia medicinensis n. sp.

(Figs. 1 & 2.)

Female. Light yellowish brown with a silver sheen in some lights. Length 5 mm. to 6.5 mm. Head as wide as thorax. Oral margin produced until vibrissal axis about equal to antennal. Third joint of antenna about three times

as long as wide, reaching almost to the vibrissal bases. Arista much longer than the third antennal segment, tapering beyond basal quarter. First two antennal segments and base of third light yellow. Remainder of third smoky. Arista dark except basally, thickly short pubescent. Palpi light yellow, elongate, cylindrical. Proboscis three times head height. Haustellum two and one-half times head height, three-quarters of apical portion dark, set with numerous short erect hairs. Labellae yellow, elongate, slender, sparsely set with short, erect hairs. Genae and parafacials white. Parafacials at narrowest point about one-third the width of the third antennal segment. Frontal stripe wider than either parafrontal, bright yellowish brown. Occiput grey pollinose. Eyes bare.



Figs. 1 and 2. *Evanalia medicinensis* n. sp.

Vibrissae well developed, cruciate, slightly above oral margin. Three weak bristles on facial ridge immediately above vibrissae. Parafacials bare. Frontal bristles eight on each side, extending to apex of second antennal segment, 1 and 2 reclinate, 3 to 6 cruciate, 7 and 8 reclinate. Orbitals two, proclinate. Parafrontals with a few weak, black hairs. Ocellars strong, proclinate, divergent.

Thorax. Dorsum of mesonotum grey brown, light pollinose, trivittate when viewed directly from above. Scutellum yellow. Humeri and pleurae whitish-yellow. One pair of well developed presutural acrosticals and one post-sutural pair well removed from the suture. Dorsocentrals two, three. A third small middle bristle often appears in the presutural row of dorsocentrals on one side only. Intrapostalar bristle missing. Scutellum with two pair of strong marginals and a weaker divergent apical pair. Sternopleurals three. Legs rather long, yellow, elongate tarsi dark in color on all legs. A small dark patch occurring dorsally on the apex of each femur. Wings almost hyaline, with very faint greyish tinge. Veins light yellow, bare except for a few bristles above and three below at the base of the third vein. The marginal cell terminating close to the

wing tip. *The apical cross vein (M1) missing and the fourth longitudinal vein evanescent with no suggestion of an upward bend.* The posterior cross vein (M3) sinuous, cubitus 1 widely arcuate and about one-third of the width of the vein from the hind margin.

Abdomen. Yellow. Some specimens showing blackish posterior segmental margins and a median vitta on segments one to three. Shiny, with a light white pollen in certain lights. No discals. Segments two with two median marginals and two or more lateral marginals. Segment three with a row of marginals.

Holotype—♀, Medicine Hat, Alta., Aug. 9, 1939 (E. H. Strickland); No. 5161 in the Canadian National Collection, Ottawa.

Paratypes—3 ♀, same data, Aug. 8, 1939; 1 ♀, Tilley, Alta., Aug. 23 (J. L. Carr).

All of the specimens taken at Medicine Hat were resting on vegetation growing in a stream bed. At the time of capture, they were mistaken for anthomyids. No males were observed, and nothing is known of their life history.

When the specimens were found not to key out in Curran's (1934) book nor in Greene's (1934) key, they were submitted to Dr. F. O. Morrison of Macdonald College, with the request that he try to locate the genus to which they belonged in the more extensive literature available there. The writer is indebted to Dr. Morrison for the relationships to Townsend's genera indicated above.

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NEW SPECIES OF MOTHS, MOSTLY CALIFORNIAN*

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I have recently had occasion to examine a good deal of Californian material sent me for determination by those two excellent and enthusiastic collectors, Messrs. E. C. Johnston and William Bauer. In the course of identification work some apparently undescribed species were discovered; this present paper deals with these and with a few other things that have been accumulating in our collection.

PHALAENINAE

Euxoa serricornis sonoma var. nov.

Primaries light ochre-brown, varying to deeper, more smoky brown, lightly sprinkled with smoky especially in the terminal area; maculation as in the typical form. No traces of the ruddy or pinkish shades found in *serricornis* and *itodes*, the color being very similar to that found in *nostra* Sm. The male genitalia are typical *serricornis* with the prongs of the harpe forming a very broad U.

Holotype—♂, Pine Flat, Sonoma Co., Calif., Apr. 28, 1940, (W. R. Bauer); No. 5173 in the Canadian National Collection, Ottawa.

Paratypes—9 ♂, same data as holotype; 2 ♂, San Raphael, Marin Co., Calif., May 18, 21, 1937, (W. R. Bauer); six of these specimens in Mr. Bauer's Collection, the others in the Canadian National Collection.

*Contribution No. 2077, Division of Entomology, Science Service, Department of Agriculture, Ottawa.

Euxoa marinensis n. sp.

Belongs in the *costata* group and is quite similar to the light brown form of *idahoensis* but *lacks the black basal streak.*

Thorax brown, shading into yellowish at costal base of wing. Primaries a deep fawn-brown, somewhat darker in cell, with white shading along costa to end of cell and broadly along inner margin; cubital vein marked with white. Cross-lines practically absent, the t. a. indicated (in one specimen) by two lighter colored scallops across inner half of wing. Orbicular and reniform prominent; former whitish, rounded, open toward costa and with slightly darker central filling; latter large, upright, constricted somewhat in middle, outlined in white with darker central filling and with a faint yellowish shade in outer central portion; claviform lacking. Subterminal area somewhat paler than median section due to faint white shading: terminal area distinctly darker, smoky-shaded, the paler subterminal area jutting into it below costa and again more prominently between veins 3 and 5 where two distinct pale streaks are visible; slight smoky shading on the border of these two areas indicates the s. t. line. Faint, small, dark terminal spots. Fringes smoky ochreous, weakly checkered by smoky spots in outer area.

Secondaries pale smoky, with slight buff tinge and a broad, diffuse deep smoky terminal band. Veins outlined in smoky. Discal dash distinct. Fringes pale ochreous cut by a broken smoky line.

Beneath primaries light fawn, sprinkled with smoky and with a heavy smoky shade in cell; secondaries paler than above with only traces of the dark terminal band; sprinkled lightly with smoky along costa, with distinct discal spot and traces (in one specimen) of a curved postmedian line. Terminal series of dark spots on both wings. Expanse, 30-32 mm.

Holotype—♂, Inverness, Marin Co., Calif., June 12, 1940, (W. Bauer); No. 5204 in the Canadian National Collection, Ottawa.

Paratype—1 ♂, same data, June 10.

The male genitalia are distinctly of the *idahoensis* type; the clasper is somewhat longer and narrower than in this species and the ventral prong of the harpe (sacculus extension) distinctly longer, especially on the right side. As the costal prong (the harpe proper) is shorter, the two prongs are in consequence on this side quite unequal in length, the ventral one being fully one-third the longer.

CUCULLIINAE

Psaphida sonoma n. sp.

Head and palpi smoky with an admixture of paler scaling. Male antennae weakly pectinate. Fore tibia with strong terminal claw but without the corneous plate of *resumens* Walk. Collar deep smoky basally, the apical half heavily shaded with whitish and crossed by a faint dark line. Thoracic vestiture roughened, largely deep smoky, with the upper section of the patagia crossed by a whitish shade. Distinct black anterior and posterior pairs of tufts. Abdomen smoky gray with strong black dorsal tufts on third and fourth segments. Primaries with squammation rather smoother than in *resumens,* light grayish, shaded with blackish, especially in the median area which is largely contrastingly blackish; maculation clean-cut and distinct. Basal area more heavily shaded with smoky in costal area than elsewhere; basal half-line indicated by a black costal dash. T. a. line gently outwardly oblique, dark, geminate, pale-filled, consisting of three weak scallops, the ones at costa and inner margin small, with slight indentations on subcosta and vein 1, the median scallop occupying the remainder of wing, forming a weak outward bulge (at times scarcely indicated.) Median space contrastingly dark as compared with basal and subterminal spaces; orbicular

round, pale, with slight, dark, smoky, central filling; reniform weakly constricted, rather broad, pale, with smoky filling; claviform a short black loop with faint, paler, enclosed shading. T. p. line dark, faintly geminate, bent around cell and slightly irregular, almost touching lower edge of reniform and then forming a prominent inward scallop in fold with slight outward angle on vein 1. Subterminal area largely grayish, strongly narrowed below reniform by a triangular dark shade projecting inward from terminal area; on inner margin, just before tornus a distinct, characteristic yellow-green shade, defining the lower edge of the above mentioned dark triangular area. S. t. line defined by darker shade in terminal area, irregular, forming slight W on veins 3 and 4 and then strongly bent inward, following the outer edges of the dark triangular mark; balance of terminal area variably smoky gray. Outer margin with series of small, black scallops. Fringes concolorous, with blackish terminal spots. Secondaries white with narrow smoky border along costal and outer edges; veins terminally marked with smoky; faint smoky discal dot and slight dots on veins towards inner margin indicating postmedian line. Fringes smoky in basal half, whitish outwardly.

Beneath primaries largely deep smoky, paler along costa with t. p. line indicated by a black dash; dark dots in fringes quite prominent. Secondaries white, faintly sprinkled with smoky on costa and terminally; discal dot and postmedian, dotted line more prominent than on upper side, latter forming a distinct dark spot at costa. Fringes pale. Expanse 35 mm.

Holotype—♂, The Geysers, Sonoma Co., Calif., Mar. 19, 1939, (W. Bauer); No. 5184 in the Canadian National Collection, Ottawa.

Paratypes—2 ♂, same data as holotype; 1 ♂, Mt. St. Helena, Sonoma Co., Calif., Mar. 3, 1940, (W. Bauer); two of these in Collection Bauer.

The male genitalia are very similar to those of *resumens* Wlk.

Behrensia bicolor n. sp.

Quite similar in general characters to *conchiformis* Grt., but differing in details of maculation and somewhat smaller in size. Collar tinged with brownish; thorax blackish with white sprinkling on the patagia; abdominal tuft distinctly brown. Primaries without any of the green scaling found in *conchiformis;* basal area deep smoky gray with black streaks in and below cell and white shading below cubital vein at base. T. a. line black with a faint, narrow, paler, inner border; strongly angled outwardly below costa, roundedly bulging across cubitus and deeply concave across the fold. Median area with costal half similar in color to basal area and inner half heavily black-shaded. Claviform a large loop outlined in black; orbicular a long, decumbent oval, filled with gray and outlined with a white inner and a black outer line, separated from reniform by an oblique, white, diffuse streak, terminating in a point on vein 2 where it almost touches angle of t. p. line; reniform narrow, margined laterally by oblique black lines which extend upward to costa. T. p. line black, rounded outwardly opposite cell, with small inward angle on vein 2, below which it is more or less perpendicular to costa, followed by a narrow brownish shade which broadens to a patch on inner margin, this being separated from t. p. line by a whitish line. S. t. and terminal areas with considerable whitish sprinkling, being, therefore, paler than remainder of wing. Faint smoky shades indicate the s. t. line. Terminal broken black line. Fringes concolorous. Beneath smoky with a white suffused area in outer portion of cell. Secondaries quite characteristic, the basal half being, on both sides, *pure white with no indication of a discal streak*, the outer half deep black. Fringes dark, tipped with white. Expanse 26 mm.

Holotype—♂, Mohawk, Plumas Co., May, 1940, (W. Winter); No. 5199 in the Canadian National Collection, Ottawa.

Paratypes—2 ♂, same locality, July (W. Winter) and April, (W. Bauer); the latter in Collection Bauer.

The genitalia are very similar to those of *conchiformis*, but the apical portion of the clasper is narrower and more pointed.

GEOMETRIDAE

STERRHINAE

Scopula johnsonaria n. sp.

Male. Belongs according to genitalia in the *quinquelinearia* group, the socii being long, weakly chitinized, broadly separated at base and with apices more closely approximate. Palpi short, blackish outwardly, with closely appressed scaling. Front black, shaded slightly with creamy along frontal edge, and with a white area between the antennae. Antennae light ochreous, ciliate, the ciliae being rather long, though sparse, somewhat longer than in 5-*linearia*. Collar light ochreous. Thorax and patagia pale creamy. Wings pale yellowish ochre (holotype), or creamy (paratype), lightly sprinkled with smoky atoms; primaries faintly bulging and secondaries noticeably angled at vein 4. Three cross-lines on primaries, indistinct, light brownish ochre; antemedian one curved, scarcely visible, two outer ones subparallel to each other and to outer margin, moderately approximate, feebly irregular, continued across secondaries as curved lines. Very faint smoky shading indicates what is probably a subterminal line. No discal dot on primaries, a small black one present on secondaries. Faint traces of terminal, brownish, broken line. Fringes concolorous with wings. Beneath color much as above but primaries heavily shaded with smoky over basal two-thirds. Outer line most distinct on both wings, smoky, slightly irregular; terminal line better defined than on upper side. Faint dark discal dot on all wings. Legs with the first two pairs smoky with paler tarsi; hind legs pale ochreous, the tibiae laterally compressed, without hair-pencil or spurs. Expanse 24 mm.

Holotype—♂, Bodega, Calif., May 3, 1936, (E. C. Johnston); No. 5174 in the Canadian National Collection, Ottawa.

Paratype—♂, Bloomfield, Calif., July 5, 1937, (E. C. Johnston); in the Canadian National Collection, Ottawa.

A smaller and more ochreous species than 5-*linearia*. In the genitalia both socii and sacculi are shorter and chunkier than in the allied species. The best point of distinction is found in the plate of the eighth segment and its cerata; the ceras on the right side is very long, almost twice as long as the corresponding one in 5-*linearia* as well as being thinner and less incurved apically; the left ceras is short, directed obliquely inwards but not with the beak-like apical incurve of 5-*linearia*.

I have much pleasure in naming the species after Mr. E. C. Johnston who has generously supplied me with much interesting Californian material.

LARENTIINAE

Dysstroma rectiflavata n. sp.

Somewhat similar in general appearance to *hersiliata* var. *manitoba* McD. General color of forewings grayish-purple crossed by a nearly upright antemedian band of orange. Basal area grayish-purple, its outer edge upright from inner margin to cubitus and then angled inward slightly to costa. Antemedian band narrow, upright with slight inward bend at costa, orange, with a still deeper orange bar filling most of the space between cell and inner margin; outer edge with faint outward angle on cubitus and a weak inward angle on vein 1. Median space broad, rather even grayish-purple with wavy smoky lines near inner and outer margins and a small dark discal dot; outer edge gently outwardly oblique to vein 6, no indentation opposite cell, bulging slightly in two weak scallops across veins 5 and 4 and then bent inward, also with weak scallops, to vein 2 from

whence it continues upright and parallel to inner edge to inner margin; it is edged outwardly by a fine whitish line followed by a faint, diffuse ochreous shade, most distinct in costal area. S. t. line indicated by smoky scallops opposite cell and above inner margin but more or less obsolescent in other areas. A strong oblique blackish dash from outer margin below apex to s. t. line opposite discal spot. A fine terminal dark line. Fringes pale smoky, cut by a darker median line. Hindwings pale smoky, deeper outwardly with fine dark discal point. Terminal line and fringes as on primaries.

Beneath primaries pale smoky with maculation of upper side indicated in the postmedian area; light ochreous costal shading in subterminal area followed by a darker smoky apical suffusion. Secondaries as above with faint dark curved postmedian line, discal dot and small patch at anal angle.

Head and thorax concolorous with primaries. Abdomen light ochreous banded dorsally with black. Expanse 25 mm.

Holotype— ♂, San Antone Cr., Sonoma Co. Calif., June 8, 1937, (W. Bauer); No. 5180 in the Canadian National Collection, Ottawa.

Paratype—1 ♂, Lucas Valley, Marin Co., Calif., June 9, 1937, (W. Bauer); in the Canadian National Collection, Ottawa; 1 ♂, Pinnacles, S. Benito Co., May 16, 1939, (W. Bauer); in Collection Bauer.

In the male genitalia the aedeagus shows a strong bunch of cornuti much as in *citrata* L., but rather narrower than in this species although much stronger than in *hersiliata* Gn.

The typical form with striking orange antemedian band is easily recognized; in the paratype from Pinnacles this banding is much obscured by smoky shades, a form of variation which occurs apparently all through this group.

Stamnoctenis costimacula Grossb.

Petrophora costimacula Grossb., 1912, Jour. N. Y. Ent. Soc., XX, 283.
Stamnodes kelseyi Wgt., 1927, Trans. S. Diego Soc. Nat. Hist., V, 41. (new synonymy).

Costimacula Grossb. was wrongly sunk in the Check List (1937) as a synonym of *ululata* Pears. A recent study of the genitalia of the type male, loaned through the courtesy of the authorities of the American Museum of Natural History, shows that it is what we have been calling *kelseyi* Wgt., this latter name falling as a synonym. Grossbeck's name was based on a specimen with rather poorly marked underside of secondaries but the type locality (San Diego) is the same as that of *kelseyi;* the genitalia also agree with those of a paratype of *kelseyi* before me. Incidentally it is quite probable, judging from the description, that *similis* Wgt., described in the same paper, is a synonym of *ululata* Pears.

Further north in California we meet with a much brighter colored race of *costimacula,* described as follows:

Stamnoctenis costimacula pallula var. nov.

Male. The dull smoky brown color of primaries is relieved with light ochreous, especially bordering the dark lines which define the triangular patch based on costa and with its apex at vein 2 or beyond, causing this patch to appear much more conspicuous than in the typical form; the costa is more noticeably shaded with ochreous, broadening apically, where it is frequently suffused with ruddy. On the underside of secondaries there is at times a distinct ruddy suffusion.

Female. More ruddy suffusion is present on the upperside than in the male, but the median patch is not so well outlined. On the underside the apical section of primaries and the entire secondaries are deep brick red with somewhat suffused, angulate, black, postmedian line well-defined and with a small amount of black shading basad of it. The discal dot is generally distinctly white.

Holotype— ♂, The Geysers, Sonoma Co., Calif., Oct. 11, 1939, (W. Bauer);

No. 5176 in the Canadian National Collection, Ottawa.

Allotype—♀, Spring Mt., Sonoma Co., Nov. 5, 1939, (W. Bauer); in the Canadian National Collection, Ottawa.

Paratypes—2 ♂, 4 ♀, Spring Mt., Sonoma Co., Nov. 5, 1939, (E. C. Johnston); 6 ♂, 8 ♀, same data as Allotype, Oct. 19, Nov. 5; 1 ♂, same data as Holotype; a number of these deposited in the Collections of E. C. Johnston and Wm. Bauer.

Xanthorhoe offensaria n. sp.

Closely allied to *munitata* and its forms, but easily separable by the much more rigidly upright outer margin of the dark median band and the well-defined scalloped smoky line paralleling it in the subterminal space, the dark venular dots of *munitata* being practically lacking. The color of primaries in both sexes is also distinctive.

Male. Antennae strongly pectinate. Palpi and head light smoky brown, thorax lighter brown. Primaries *pale fawn*, the basal area darker, tinged with purplish and the median area crossed by a broad purple-brown band, paler centrally; the terminal area, especially below apex, is suffused with smoky shading. Basal area not sharply defined, its outer margin angled slightly inward between cell and costa, crossed by obscure dark lines. Pale fawn antemedian area with outer margin strongly outwardly rounded as in *munitata* (frequently with slight notch on subcostal vein), crossed by a wavy, median, smoky line. Median purple-brown area with distinctly darker, sharply defined bands edging both lateral areas, the color being *purplish* and not blackish as in *munitata*, the veins further *not* noticeably outlined in black; minute discal dot hardly visible; the outer margin of this area is almost rigidly upright with slight inward curve in fold and occasionally a very gentle bulge crossing veins 3 and 4. Subterminal area *light fawn* (not the whitish color of *munitata*) crossed by a median, gently scalloped, smoky line, parallel to outer margin of median area. Terminal area suffused with smoky, strongest shortly below apex of wing, with obscure dark dots on the veins on the dividing line between the smoky terminal and lighter subterminal areas. Fringes smoky in basal half, pale outwardly.

Secondaries very pale smoky fawn, deeper smoky outwardly; traces of a gently curved (not angulate) postmedian smoky line and several crenulate, obscure, parallel lines in subterminal area.

Beneath primaries with basal half and terminal area smoky; costa, except at apex, and subterminal area light fawn, the latter area with traces of the dark line of upper side. Secondaries light fawn sprinkled with smoky with dark lines of upper side better defined and a minute dark discal dot present.

Female. Primaries of a general *light cinnamon-brown* color with the darker, purplish, median area standing out much less strongly than in *munitata* females. The outer edge of this area shows a slightly stronger bulge crossing veins 3 and 4 than is found in the male sex. Other features, including cross-lines much as in male. Expanse 25 mm.

Holotype—♂, Inverness, Marin Co., Calif., July 2, 1940, (W. Bauer); No. 5185 in the Canadian National Collection, Ottawa.

Allotype—♀, same data, June 10.

Paratypes—2 ♂, 8 ♀, same data as Allotype, six of these in Collection Bauer; 1 ♀, same data, Apr. 28, 1940, in Collection Bauer; 1 ♀, same locality, May 31, 1938, (E. C. Johnston), in Collection Johnston; 1 ♀, Freestone, Calif., Apr. 27, (E. C. Johnston) in the Canadian National Collection, Ottawa.

The male genitalia are very similar to those of *munitata*, but the spined manica are shorter and broader and the two long spines projecting from their bases *distinctly shorter*. The dorso-apical section of the anellus shows fewer and longer spines and the calcar appears to be somewhat shorter.

Camptogramma (?) associata n. sp.

Very closely related, according to male genitalia, to *indefinata* Grossb., but paler in color with the maculation, especially the median band, much better defined.

Male antennae flattened, female thread-like. Palpi and front blackish. Thoracic vestiture smoky, mingled with light ochreous, terminal half of patagia largely pale. Abdomen smooth, light ochreous with slight smoky sprinkling. Primaries light ochre-fawn, somewhat sprinkled with smoky, especially the median band which, in consequence, stands out rather sharply. Costa black at base, the pale basal area defined by a gently curved black line. Antemedian space rather broad, light fawn, crossed by several diffuse and irregular blackish lines and bands running more or less parallel to inner margin of median area. Inner edge of median band well-defined by a narrow, irregular, blackish band, in general curved, with short inward angles on the veins; central portion of this section, especially at costa, paler, with a minute black discal dot; outer edge of area defined slightly by interior blackish shading, gently outcurved below costa, angled inwardly on vein 5, then with a prominent bulge crossing veins 4 and 3 and bending inward to vein 2 where it angles and descends, more or less upright, to inner margin with a slight inward angle on vein 1; width of area at inner margin about half that at costa. The pale subterminal area is crossed by two fine, dentate, smoky lines which in the lower portion of wing are practically reduced to dark spots on the paler veins. Subterminal line pale with three strong teeth between costa and vein 5, defined inwardly by a rather broad blackish shading; below vein 5 indistinct and like the two preceding lines limited to spots on the veins. A faint darkish apical shade. Terminal, dark, faintly wavy line, somewhat broken by pale streaks in costal half of wing. Fringes dusky. Secondaries smoky-fawn, crossed by a darker postmedian line which bends backward between veins 3 and 4 as far as vein 2 where it angles and descends perpendicularly to inner margin. Between this and anal angle of wing is a slightly paler shade crossed by several wavy lines, some of which may be traced towards costa by dark dots on veins. Terminal line and fringes as on primaries. Beneath primaries even smoky fawn with the upperside maculation of subterminal and terminal areas partially repeated. Secondaries somewhat paler except in terminal area, with small dark discal dot and the postmedian and subterminal lines of upperside broken into dark dots on the veins. Expanse ♂, 30-34 mm., ♀, 37 mm.

Holotype—♂, Denny, Trinity Co., Calif., Aug. 12, 1935, (W. Bauer); No. 5179 in the Canadian National Collection, Ottawa.

Allotype—♀, Petaluma, Sonoma Co., Calif., 1932, (W. Bauer).

Paratypes—1 ♂, same locality and collector as holotype, Aug 8, 1935; 16 ♂, Mohawk, Plumas Co., Calif., July 21-25, Aug. 4, 11, 17, 1940, (W. Bauer); 1 ♀, Wilson Cr., Plumas Co., Calif., Aug. 1, 1940, (W. Bauer); 11 ♂, 1 ♀, of these in Collection Bauer, the others in the Canadian National Collection, Ottawa.

This species was erroneously figured in Holland's *Moth Book*, Pl. 42, fig. 36 as *californiata* Pack. which is a *Triphosa* and at once separable on the strongly scalloped outer margin of secondaries.

It is probable that our present conception of the genus *Camptogramma* Steph. will have to be revised as the North American species at present listed in it contain incongruous elements and are apparently not particularly closely related to *bilineata* Linn., the European genotype. Until this can be done, however, *associata* may stand next to *indefinata* to which it certainly is generically related.

ENNOMINAE

For some time I have had before me specimens of a species, orginally collected by O. Poling and sent me as *lamiaria* Stkr. As it is obviously not this

species and as it differs markedly in genitalia (although the type of maculation is quite Cleorid) from any species treated in my Cleorid revision, I have come to the conclusion that a new genus as well as a new species is represented which is probably distantly allied to certain genera of the *Tornos* group and which may be placed for the present next to *Morina* Grossb. and *Holochroa* Hlst.

Hemimorina gen. nov.

Male antennae shortly plumose with simple apical third; female antennae simple. Proboscis well-developed. Palpi projecting well beyond front, rather rough-scaled dorsally. Front slightly bulging, smooth-scaled. Thorax smooth-scaled with slight divided posteromedian tuft. Abdomen smooth. Hind tibiae scarcely swollen, with hair pencil and two well-developed pairs of spurs. Primaries narrow, rather pointed apically, with well-rounded outer margin; in secondaries outer margin is weakly scalloped. Primaries without fovea in male, 12-veined, 5 weak, 10 anastomosing with 9 at a point to form a long narrow areole, 7 from areole near apex, 8 and 9 stalked from apex, 11 from base or from near base of areole, anastomosing with 12; secondaries with 8 veins, 3 and 4 well separated, 5 a mere fold, 6 and 7 connate, 8 closely approximate to cell half-way to apex of same. Male genitalia with short uncus, broadly truncate apically, gnathos well-developed, *clasper with free costal arm,* broadly attached at base, valvula short and rather trigonate, with bluntly rounded apex and no armature.

Genotype: *Hemimorina dissociata* n. sp.

Hemimorina dissociata n. sp.

Palpi smoky with slight admixture of pale scaling. Front centrally black with grayish-white scaling anteriorly and posteriorly; apex of head behind antennae largely grayish with a dark line between the antennae Thorax similar to head with an anterior transverse black band connecting bases of primaries and black posterior tufts. Abdomen dorsally with black band across basal segment, second segment grayish, remainder blackish with narrow white scaling on posterior margins; laterally and ventrally pale. Primaries gray, heavily sprinkled with smoky; t.a. line black, from costa beyond one-third, sharply angled outwardly on subcostal vein and then evenly oblique inwardly to inner margin near base, preceded by a distinct, deep smoky shade-band; a median, impromінent, smoky line, closer to t. p. than to t. a. line and subparallel to it, slightly incurved in cell and bulging weakly crossing cubital vein, apparently obscuring discal dot. T. p. line arising on costa nearer apex than usual, black, more or less parallel to t. a. line, very feebly sinuate with a small outward angle on vein 7, followed by a deep smoky shade-band which at the above-mentioned angle leaves the t. p. line and runs, somewhat narrowed, to apex of wing. S. t. line arising from base of this fork, white, narrowly shaded with smoky inwardly, irregular, twice feebly dentate in the interspaces between veins 5 and 7 and with a strong outward tooth above vein 2, curving in to reach inner margin at a point close to the postmedian shade-band. Narrow terminal black line, accentuated interspaceally with black dots. Fringes light smoky, checkered with deeper smoky opposite veins.

Secondaries pale, heavily suffused with smoky. A black basal spot; a smoky oblique median line on inner half of wing, arising from faint discal dot; a blacker, postmedian, parallel line not attaining costa and edged outwardly by a smoky shade; a whitish, faintly irregular s. t. line, bordered inwardly by smoky and with subterminal space between it and postmedian band, pale. Terminal line and fringes as on primaries.

Beneath whitish, especially secondaries, the primaries being lightly suffused with smoky. Faint discal dots on all wings and traces of postmedian lines, accentuated by dots on the veins; a dark terminal line. All this is better defined

on secondaries than on primaries. Fringes pale, those of primaries checkered with smoky. Expanse 22-30 mm.

Holotype– ♂, Alpine, Tex., Apr. 15, 1930; No. 5187 in the Canadian National Collection, Ottawa.

Allotype– ♀, same locality, June, 1926.

Paratypes–3 ♂, same locality, May 13, 17, June –; 1 ♂, Texas (no locality, but probably from same source as others).

Hemnypia gen. nov.

Male antennae flattened and finely ciliate (as in *Sabulodes*), female antennae thread-like. Palpi short, sub-ascending. Proboscis well-developed. Front smooth, flat. Male hind tibiae thin, without hairpencil. Wings broad, faintly angulate on vein 4. Forewings with 12 veins, 5 weak, 7, 8, 9, 10 stalked, 10 from stalk of 8 and 9 before 7, 11 from cell, anastomosing at a point with 12, no areole; hindwings with 8 veins, 3 and 4 well separated at base, 5 a mere fold, 6 and 7 slightly separate, 8 approximate to cell to nearly middle of same. In the male genitalia the claspers show a short, free costal arm and pointed, smooth, subtriangular valvulae; uncus short, rounded apically, finely spinulate on dorsal side; gnathos well-developed.

Genotype: *Hemnypia baueri* n. sp.

Hemnypia baueri n. sp.

Palpi smoky brown, front creamy, tipped above with brown and with a brown line between the antennae. Thoracic vestiture smoky brown with faint sprinkling of whitish scales. Abdomen pale, smooth. Primaries deep wood-brown, the veins, particularly the cubitus and its branches, spotted with whitish. Three small, equidistant, dark patches on inner margin representing termination of cross-lines; these are somewhat defined by pale intermediate and exterior shading. Maculation indistinct; an upright, smoky, slightly irregular t. a. line; an obscure smoky discal ringlet below which can be seen an incurved dark line which approaches the t. a. line in the fold and runs parallel to it to the middle one of the three dark patches above mentioned. Subterminal line irregular, faint in the male specimen before me but in the female strongly accentuated by black shading with a prominent outward angle on vein 4 and an inward angle on vein 2. A terminal series of dark dots; fringes concolorous. Secondaries heavily sprinkled with smoky with small discal ringlet, terminal black dots and two slight dark patches along inner margin. Beneath sprinkled with dull smoky over a pale smoky ground-color; primaries show faint traces of the upper side maculation; secondaries have a better defined discal ringlet and a curved, faintly dentate postmedian line. Expanse 30 mm.

Holotype– ♂, Pont Arena, Mendocino Co., Calif., Aug. 5, 1936, (W. R. Bauer); No. 5175 in the Canadian National Collection, Ottawa.

Allotype– ♀, Fort Bragg, Mendocino Co., Calif., Mar. 26, 1937, (W. R. Bauer).

Paratype–1 ♀, same locality and collector as allotype, Apr. 5, 1937, in Collection of Wm. Bauer.

Superficially the species is reminiscent of an *Enypia*, but the type of genitalia forbids this association and places it apparently in close connection with *Hemimorina*, just described on the preceding pages. I have, in spite of considerable searching, been unable to find any name, either generic or specific, which would apply, and venture to name the species in honor of Mr. Wm. Bauer, an enthusiastic collector from whom I have received much material of interest.

The male genitalia, apart from characters already mentioned in the generic diagnosis, possess a long thin aedeagus with the vesica armed with a single long cornutus about two-thirds the length of the aedeagus.

Cochisea sonomensis n. sp.

Very similar to *C. rigidaria* B. & McD. (1916, Contr. III (1), Pl. II, fig. 2) but with the t. p. line of primaries somewhat incurved between veins 3 and 4 and generally faintly bulging across vein 2. The ground color is whitish, sprinkled with smoky, the basal area and a broad band beyond the t. p. line deep brown. Secondaries much as in *rigidaria*. Expanse 40 mm.

Holotype—♂, Spring Mt., Sonoma Co., Calif., Oct. 13, 1939, (W. Bauer); No. 5177 in the Canadian National Collection, Ottawa.

Paratypes—12 ♂, same data as holotype (Collectors Wm. Bauer and E. C. Johnston); 1 ♂, same locality, Oct. 21, 1938, (E. C. Johnston); some of these in Collections Bauer and Johnston.

A form in which the brown basal and subterminal areas are lacking occurs not infrequently and may be known as f. ABRUNNEA. The holotype and three male paratypes bear the same data as the other specimens.

Pterotaea albescens n. sp.

Belongs in the typical section of the genus, being without fovea in the male at base of forewing and with a white hair-pencil on the hind tibia, although somewhat reduced in size.

Male. Antennae strongly bipectinate. Palpi rather short, scarcely projecting beyond front, clothed with an admixture of black and white scaling. Head, collar and thorax white, with a more or less evident band across front; a line between the antennal bases, a patch behind the antennae and eye and the apical portion of the collar, blackish; there are also a few scattered black scales on patagia and centre of thorax. Abdomen whitish with traces of blackish cross-bands on segments posteriorly. Primaries whitish, crossed by intense black t. a. and t. p. lines, tending to expand on the veins; these lines are rather close together, inwardly oblique and subparallel, the t. a. line strongly, the t. p. line weakly bent inward at costa, both ending in a small black costal blotch; t. p. line slightly incurved on fold; t. a. line bordered inwardly and t. p. outwardly by narrow band of light olive-brown. Median space cut by a less prominent, median, blackish line, arising from a costal patch (at times this line is quite diffuse). A small black discal dot. S. t. line white, scalloped, improminent, rather lost in the general white color of the subterminal area; small black streaks (which may expand to a small patch) on veins 3 and 4 preceding s. t. line. Terminal area faintly buff with an oblique blackish streak below apex of wing. A lightly crenulate, black terminal line. Fringes white, checkered weakly with smoky.

Secondaries white, lightly sprinkled with smoky. A blackish postmedian line, not attaining costa, shows minute teeth on the veins and a slight angle on vein 3; it is preceded by a diffuse black line only distinct on inner half of wing, and followed by a parallel olive-brown shade from which it is usually separated by a narrow white line. Discal dot very minute. A weakly crenulate white s. t. line is preceded by a light smoky shade-band. Terminal area light buff as on primaries. A black, crenulate, terminal line and fringes as on primaries. Beneath whitish, sprinkled with smoky brown, which on primaries tends to form a dark shade before apex. Small dark discal dots on all wings, more prominent than on upper side. Dark terminal line on both wings. Expanse 30-32 mm.

Holotype—♂, Ukiah, Calif., May 20, 1938, (E. C. Johnston); No. 5186 in the Canadian National Collection, Ottawa.

Paratypes—2 ♂, same data.

In one paratype the area between the median and t. p. lines is strongly suffused with blackish.

The genitalia are typical for the genus, symmetrical and close to those of *agrestaria* Grossb. as figured in my Cleorini revision, Pl. VI, fig. 11. The whole organ, however, is larger; the claspers are broader, the well-chitinized costal area

occupying fully half the width of clasper, extending nearly to apex, and being squarely cut off terminally; its apical armature consists of three strong, well spaced spines on left clasper and four similar spines (the extra apical spine smaller) on right clasper, this feature probably not entirely constant. The vesica is armed with a longitudinal row of about eight rather chunky, slightly curved spines, the two smaller, basal ones attached to a small patch of chitin, these spines fewer and stouter than in *agrestaria*. Distad of this spine-row is a further patch of numerous fine, short, cornuti; these spined areas occur in the apical half of the narrow pointed aedeagus, which is both longer and broader than in *agrestaria*.

Pterotaea campestraria n. sp.

Very close to *agrestaria* Grossb. and scarcely separable from it on maculation alone. In the male the wings appear to be slightly more evenly smoky, due to the reduction of the whitish shading; this is especially noticeable in the median area, particularly basad of the t. p. line, only the area around the small discal spot being relieved by paler shading. The t. p. line is narrow and rather more evenly oblique than in *agrestaria* and the white scallops of the s. t. line less prominent. On the secondaries the median line seems slightly closer to the postmedian line.

The main differences are structural and as follows: The pectinations of the male antennae are slightly shorter, the palpi, especially in the female are decidedly shorter and extend little beyond the front; the fovea at the base of primaries in male is practically non-existent and can only be traced on the underside as a very slight depression above base of vein 1, whereas in *agrestaria* this depression is quite obvious. In the male genitalia the apical armature of the thickened costa on left clasper resembles a *hand with the fingers spread out*, 5 spines constituting the fingers, and the whole section being *considerably raised* above the surrounding area; in *agrestaria* the 4 or 5 spines lack the resemblance to a hand and are arranged in a slightly curved vertical row along the inner margin of the chitinized costal area. On the right clasper of the present species this spined area is slightly asymmetrical; the hand has been laterally contracted so that the spines are closer together and there appears to be one fewer, although this may be a variable feature. The aedeagus is noticeably longer than in *agrestaria* and the vesica in its apical half shows only a *single longitudinal row* of moderately long cornuti, which taper off in size toward apex of aedeagus; in *agrestaria* there is an additional spine-cluster of very fine spines extending beyond the apex of the first row nearly to apex of aedeagus. Expanse ♂, 30-33 mm.; ♀, 30 mm.

Holotype—♂, La Posta, Calif., June 11, 1937, (E. C. Johnston); No. 5188 in the Canadian National Collection, Ottawa.

Allotype—♀, Spring Mt., Sonoma Co., Calif., July 24, 1938, (E. C. Johnston).

Paratypes—1 ♂, Same data as allotype; 1 ♀, Santa Rosa, Calif., June 26, 1937, (E. C. Johnston).

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